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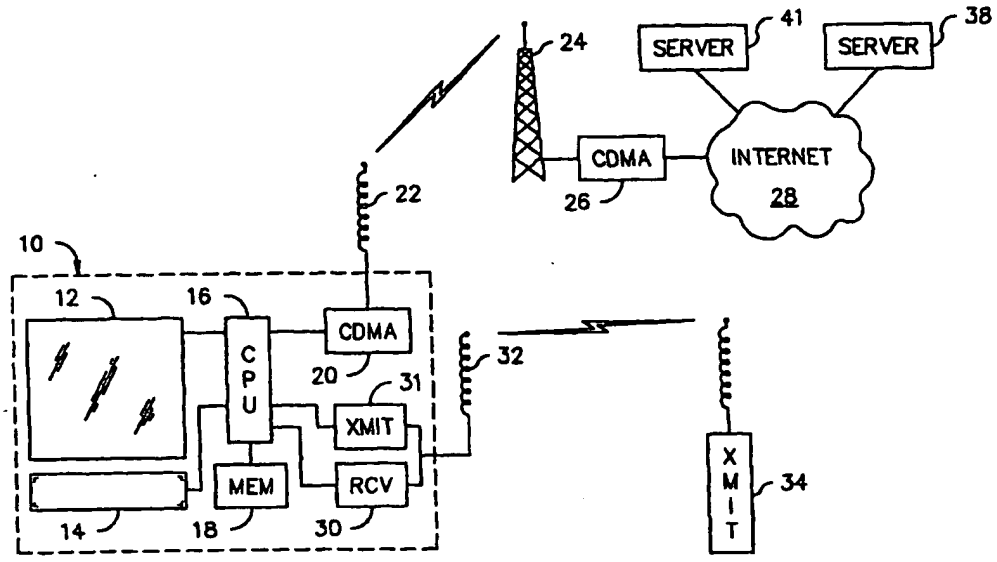
(54) Title: RETRIEVAL OF INFORMATION FROM A REMOTE NETWORK BASED ON SPATIAL CONTEXT



(57) Abstract: A portable information retrieval apparatus (10) is provided with a wireless data transceiver (22) for communicating with a remote computer data network (28). The apparatus (10) is further provided with a receiver circuit (30) responsive to a local transmitter (34). The apparatus (10) is programmed to respond to the local transmitter (34) by retrieving information from the data network (28) relevant to the location or identity of the local transmitter (34). In an alternative embodiment, the apparatus includes independent position location means such as a Global Positioning System receiver (82) for determining the location of the apparatus (10) and retrieving information for the network (28).

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RETRIEVAL OF INFORMATION FROM A REMOTE NETWORK BASED ON SPATIAL CONTEXT

Jon Pressman

Field Of The Invention

The present invention relates to apparatus and methods for delivering information to an individual in which the information is relevant to the location of the individual, or in which the information is contextuallly-related relevant to the location of that individual relative to other individuals or establishments.

Background

The internet is a popular medium through which people can obtain information of interest to them and through which people may express themselves. The quantity of information available, the opportunities for commercial and social interaction and for building communities of interest, has grown to the point where the internet is considered to be a world of its own - referred to as "cyberspace". Although one of the internet's strengths is the ability to facilitate personal and commercial interaction on a global scale, cyberspace is a world set apart from the user's physical situation in the real world. The tremendous amount of information that is available can itself make it difficult for the user to be made aware of, or to find, information that is relevant to the local environment of the user. A user searching the internet for a particular variety of merchandise or personal service may, for example, be as likely to find a vendor of such goods and services on the other side of planet as they are to find one in their own town. Similarly, while geographically distributed communities of interest have been formed in chat rooms, news groups, bulletin boards, and email lists, it can be difficult for a user

to locate others sharing their personal interests who are not geographically remote.

In the past, people have generally connected to the internet from stationary devices, such as a desktop computer. The development of personal digital assistants and other highly compact information terminals, along with the development of low cost digital cellular communication services, have converged to allow nearly continuous portable connection to the internet. However, although the user may now transmit and retrieve information from the internet with a portable device, the transactions which occur are no more spatially relevant than the transactions which were possible from a desktop computer.

In view of the foregoing, it would be desirable to provide apparatus and methods which provide a spatial connection between physical space and information that may be provided or transmitted in cyberspace. It would further be desirable to provide apparatus and methods by which information may be displayed to, or transmitted from, a user on the basis of the physical position of the user relative to other users.

Summary

Obtaining information via the internet is often referred to as "surfing", because it can be a relatively aimless activity. Other terms associated with internet information retrieval are such phrases as "navigating" the internet, or "visiting a web page". It is an objective of the present invention to provide a more literal meaning to such phrases, by translating the user's real-world navigation, visits, and movements into an experience in which information is received or transmitted

via the internet in accordance with the actual navigation, visits, movements, and social and commercial transactions of the user.

In accordance with one aspect of the present invention a portable data terminal having a display is configured for maintaining a connection with the internet. The portable data terminal is further provided with a radio frequency (RF) receiver for receiving low-power RF signals when the portable data terminal is located near a low-power local transmitter. The local transmitter is positioned at a location from which the operator seeks to cue portable data terminals to receive a link to information available via the internet which is relevant to the location of the low-power transmitter. The portable data terminal is configured to receive such a cue and to respond by retrieving the spatially relevant information.

The portable data terminal further has a low power transmitter for signaling its proximity to other similarly-configured terminals, and for transmitting a cue signal to provide a link to information pertaining to or associated with the user. Hence, when the user is in physical proximity to another similarly-equipped user, the respective data terminals of the users will exchange cue signals, and each user will be provided with a link to the information associated with the other user.

In accordance with another aspect of the present invention, a method for filtering spatially-obtained links to information by a portable data terminal is provided. The user may define a personal profile according to which information received pursuant to receipt of a cue signal is matched against the personal profile of the user, and information which is not of interest to that user is not retrieved. Conversely, the filtering methods of the present invention provide a mechanism by which the user may automatically obtain information of interest to the user and

which is relevant to the user's physical location.

Brief Description of the Figures

The foregoing Summary and the following Detailed Description will best be understood in conjunction with the attached drawings in which:

FIG. 1 is a block functional diagram of apparatus arranged to operate in accordance with the present invention;

FIG. 2 is a diagram of an electronic signaling protocol employed in the present invention; and

FIG. 3 is a flow diagram of a method of carrying out the present invention.

FIG. 4 is a block functional diagram of an alternative embodiment of the invention;

FIG. 5 is a diagram of an index page of information made accessible in the embodiment of FIG. 4;

FIG. 6 is a diagram of a table of information collected and stored in a mobile device in accordance with the invention; and

FIG. 7 is a block diagram of an embodiment of the invention employing Global Positioning System data.

Detailed Description

Referring now to FIG. 1, there is shown a portable data terminal 10. The terminal 10 includes a display 12, such as an LCD display; an input interface 14, such as a pressure-sensitive pen actuated interface 16; a processor 16; a memory 18; a cellular communication transceiver, such as a code-division multiple access

(CDMA) transceiver 20; and an antenna 22 connected with the CDMA transceiver 20. The aforementioned portion of the portable data terminal 10 may comprise a personal digital assistant (PDA) of a well known type, such as a "PALM" computer manufactured by 3Com Corporation. The portable data terminal 10 is provided with appropriate software by which the processor 16 may control the CDMA transceiver to establish bi-directional communication with a remote computer network, such as the internet 28, via a stationary CDMA base station 26 and its associated antenna 24.

The portable data terminal is further provided with a RF receiver 30, distinct from the receiver circuitry of the CDMA transceiver. The RF receiver 30 is configured to receive low-power RF transmissions when the RF receiver is within the vicinity of a low-power RF transmitter, such as transmitter 34. The RF receiver 30 may receive such transmissions via antenna 32, which is operated independently of the antenna 22 connected with the CDMA transceiver.

The transmitter 34 is operative to generate a low-power RF transmission in the immediate vicinity thereof. For example, the transmission strength of the transmitter 34, and/or the gain of RF receiver 30, is low enough to confine the transmission and reception of signals from the transmitter 34 to within several hundred yards, and preferably within less than 100 yards of separation distance between the transmitter 34 and the portable data terminal. The transmitter 34 is configured to transmit a cue signal into which various information pertinent to the operator of the transmitter 34 may be encoded. For example, the operator of the transmitter 24 may desire portable data terminals within the vicinity of the transmitter 34 to receive particular data, such as may be contained in a web page

stored on a server 38 connected with the internet 28.

For example, the transmitter may repeatedly issue a cue signal of the type shown in FIG. 2, which comprises a packet 33 of data containing a pre-defined start sequence 35, for signaling the initial portion of the packet; a transmitter identifier 37 code, which is a unique identifier assigned to the transmitter; a link portion 39, into which is encoded an address of the server 38; and, optionally, a profile identifier 41, into which is encoded indexing data about the type of information available from the server. The end of the cue signal 33 is signified by a predetermined stop sequence 43.

The processor 16 of the portable data terminal 10 is programmed to respond to the cue signal 33 as follows. Initially, at step 40, the terminal 10 operates in a scanning mode, and the processor controls the receiver to scan a sequence of RF channels allocated for the use of low-power RF transmissions. When a signal is detected in the current channel, the processor ceases scanning, hold the present channel, and proceeds to step 42.

In step 42, the receiver waits to detect the start sequence of a cue signal. If no start sequence is detected within a predetermined time, then the processor returns to scanning mode in step 40. When a start sequence is detected, the transmitter identifier, the link data, and the profile identifier are buffered by the receiver and passed to the processor. The processor then proceeds to step 44.

from 7+ 34

In step 44, the processor determines whether the transmitter identifier matches any recently received cue signals from the transmitter. For this purpose, the processor maintains a list in memory of transmitter identifiers from which cue signals have recently been received. If a match is detected, then the processor

returns to step 40, and scans the remaining channels in the allocated band. If, in step 44, the transmitter identifier does not match a recently detected transmitter identification, then the processor proceeds to step 46.

In step 46, the processor decodes the profile identifier and compares it to a pre-selected personal profile of the user of the portable data terminal. When the user initializes operation of the portable data terminal 10, the user is provided with a menu of personal preferences by which the user establishes a personal profile in order to designate categories of information in which the user is interested, and the user's preferences within such categories. These selections are encoded as a binary sequence within the memory for comparison with received profile data obtained from incoming cue signal transmissions. If, in step 46, no match is found between the profile data and the stored personal profile, then the processor returns to step 40. If a match is found, the processor proceeds to step 48.

In step 48, the processor determines whether the user has selected an immediate display mode of operation, or a storage mode. These two modes of operation are provided so that the user may select to be alerted to the receipt of incoming cue signals determined to be relevant, or the user may alternatively select to review incoming messages at a later time. If the user has selected storage mode, the processor proceeds to step 50, wherein the link information is stored for later review, and the unit returns to scanning mode. If the user has selected immediate display mode, then the processor proceeds to step 52.

In step 52, the processor sends an hypertext transfer protocol (HTTP) request, via CDMA interface 20, to retrieve information from the server 38 connected to the internet 28. Such information may include textual or graphic

information, for example a web page containing links to further information, or a single graphic image. Then, in step 54, the HTTP request is fulfilled, and the retrieved information is presented on the display 12. The user may further interact with the information, such as by following links, or responding to queries via the input interface 14 via continued HTTP communication with the server 38.

One application of the present invention is to provide spatially dependent and relevant advertising information to the user. Another application is the contextually relevant distribution of time, location and/or date-relevant information such as coupons, circulars, trading cards, lottery tickets and registration forms. For example, the user may have indicated in her personal profile that she has an interest in home improvements. A contractor may be performing work in the user's vicinity, about which the user may not be aware. A common practice for such contractors is to place a sign or placard to identify properties where the contractor is performing work. In accordance with the present invention, such a contractor may also locate a transmitter of the type described herein, at the site where such work is being performed. The transmitter may be configured to generate a cue signal wherein the link portion includes a Universal Resource Locator (URL) specifying the location of a web page on the internet where photographs, other information about the work in progress, or about the contractor's services generally, may be obtained.

Continuing with the present example, when the user is in the vicinity of the contractor's transmitter, the portable data terminal 10 of the user will receive the cue signal from the contractor's transmitter. The portable data terminal will further detect a match between the contractor's profile identifier, and the user's

corresponding personal profile indicating her interest in home remodeling. Hence, as the user comes into the vicinity of the location where work is being performed by the contractor, the user's portable data terminal 10 will retrieve the relevant link from the cue signal, by which the user may be immediately informed of the work in progress, as well as being provided with more comprehensive information about the contractor than would otherwise be available on a sign or placard. For example, when the portable data terminal 10 retrieves information pursuant to the cue signal from the transmitter 34, the remote server may be configured to provide the data terminal 10 with an index of further links to information pertaining to other relevant real-world locations of potential interest to the user.

In the alternative embodiment, the step 44 in the procedure described above can be modified to allow repetitive transmissions from the data terminal 10 to obtain data from the remote server. In this manner, the remote server can monitor the length of time during which the data terminal is co-located within the vicinity of the cue signal transmitter, and select information to be provided to the data terminal 10 on the basis of the length of time, and hence, the degree of contextual involvement, that the user has spent in the vicinity of the cue signal transmitter. Subsequent links received by the data terminal 10 on the basis of lengthened contextual involvement can replace the prior-received links in the memory of the data terminal in association with that context.

The principles of the present invention further provide a mechanism for a bi-directional exchange of relevant spatially-coordinated information. As has been described thus far, the portable data terminal 10 is enhanced with a low-power RF receiver 30 for receiving cue signals from low-power RF transmitters. The

portable data terminal itself may be further enhanced with a low-power RF transmitter 31, connected with the antenna 32 and with the processor 16. During scanning mode, as discussed above in connection with step 40 of FIG. 3, the processor may transmit, via the transmitter 31, a cue signal containing a start sequence; a transmitter identifier; a link to pre-selected contextually dependent information about the user, such as may be stored on a subscription basis on the user's internet server 39; and a profile identifier classifying the information available from the user's internet server 39. Hence, each user of the device is capable of effectively transmitting information pertaining to himself or herself, while also receiving information from others with whom the user comes into physical proximity.

In order to provide for operation of several such terminals 10 in relative proximity, the scanning step 40 may operate as follows. The processor first tunes to an initial channel of the RF receiver 30 and determines whether the channel is quiet. If there is no activity on the channel, the processor transmits, via the transmitter 31, a selected number of repetitions of the user's cue signal. Then, the processor resumes scanning the available channels, pausing to transmit the cue signal whenever a quiet channel is found. By alternating between scanning and transmission, the portable data terminals 10 will ultimately become aware of the presence of similar such devices in the immediate area, and will ultimately find a quiet channel for transmission of the cue signal.

As can be appreciated, organizations and individuals may want to communicate different kinds of information to others, depending upon the mutual interest(s) or affiliation(s) of the parties which caused a match between the

respective profile identifiers and the respective personal profiles. For example, a member of a fraternal organization may desire to signal his presence in the vicinity of another member of the fraternal organization, and may additionally or alternatively desire to provide information about his law practice to individuals who have indicated an interest in seeking legal services. In order to serve such multiple purposes, the link portion of a cue signal can be configured to point to a "gateway" web page stored on the user's server containing further links thereon, and organized according to profile identifier codes.

For example, the link portion of the cue signal transmitted by the fraternity member / lawyer would point to a web page wherein any of two further links could be retrieved. The processor of the portable data terminal 10, in constructing and transmitting the HTTP request described herein above in step 52 , would append the relevant code portion of the profile identifier which caused a match in step 46. Then, rather than to directly retrieve the information at the URL indicated by the link, the processor would retrieve the gateway page, and then proceed to retrieve the link on that page corresponding to the matching portion of the profile identifier which triggered retrieval of the page. Such a functionality may be provided as just described, or by transmitting the matching portion of the profile identifier as an input parameter to a common gateway interface (CGI) script executable on the user's server in response to an HTTP request in order to service the HTTP request in a variable manner depending upon such an input parameter.

In an alternative embodiment, the cue signal, such as that produced by a data terminal 10 or by the transmitter 34 in order to signal presence in a

particular area, may be reduced to a single unique identification code. In such an embodiment, filtering of relevant information based on a stored personal profile can be carried out by the server 38, which can store the relevant personal profile data for each user. Whenever a data terminal then receives a cue signal containing a unique identification code, the terminal first matches the code against recently received codes in order to prevent repetitive information retrieval. Then, if the code does not match the recently received codes, the data terminal transmits a message to the server indicating receipt of the code. The server then matches the code to an index of potential links associated with the received code, and further matches the stored personal profile information of the user against the list of potentially relevant links stored in association with the received code. If a link associated with the code corresponds to an indicated personal interest of the user, then that link is sent to the user's data terminal. The user's data terminal will then fetch the data corresponding to the link in immediate mode, or store the link for later retrieval in delayed retrieval mode. The personal profile data stored at server 38 can be accessed and customized by the respective users in order to establish and update such data.

In such a system where the cue signal comprises a unique identification code, the transmitter 34 may be a passive radio-frequency identification device, such as a radio-frequency identification (RFID) tag. The data terminal 10 is configured, in such an embodiment, to periodically transmit a probe signal via transmitter 31.

An illustrative example of an application in which RFID tags may be employed to provide a cue signal for a data terminal 10 to obtain remotely stored

data is shown in FIG. 4. An object, such as a wedding portrait 60, can be configured to provide a portal to a variety of information associated with the portrait 60, such as information about the wedding itself, as well as links to advertising information for costumers, caterers, travel agents, and other businesses associated with the provision of goods and services for the wedding of the couple depicted in the portrait 60. In order to provide a cue signal to retrieve such information, the portrait is provided with an RFID tag 62 embedded in the frame. The RFID tag 62 may be of the type in which a plurality of RF resonators is embedded therein in order to respond to an RF probe signal by emitting a combination of RF frequencies that is uniquely associated with that tag 62. The data terminal 10 is configured to periodically emit an RFID probe signal 64 and to receive the resulting resonant signal from the RFID tag 62 as a cue signal uniquely identifying that tag 62. When the data terminal 10 receives the RFID cue signal from the tag, the data terminal 10 transmits the corresponding coded identification to server 66 via the internet 68.

The server 66 is provided with a connection to a database 70 of RFID codes and associated hypertext links to indices of information associated with each RFID code. In the current example, the RFID code corresponding to the tag 62 is associated with a hypertext link to an index of available information pertaining to the portrait 60. The server obtains the corresponding hypertext link and transmits the link to the data terminal 10 for immediate access or for later retrieval as described above. The hypertext link may correspond to a web page such as the index page 72 shown in FIG. 4. The page may identify "John and Martha's Wedding Portrait" as a contextual key which triggered retrieval of the

page by the data terminal, and can provide interactive links to the various informational aspects which have been associated with the portrait, such as links to the caterer, bridal shop, and travel agent involved in the wedding. If the user is in immediate retrieval mode, the user may follow those links to obtain information on any aspect of the wedding in which the user is interested.

If the user is not operating the data terminal in immediate retrieval mode, the data terminal may maintain a stack of links that have been received during the course of the user's travels for later review. Such a stack 74 is illustrated in FIG. 6. In order to provide a reminder of the context in which each link was received, the stack 74 may comprise a context field 76 identifying the context of each link, a spatial or temporal data field 77 identifying the time and/or location at which the link was received, and a link field 78 providing a hypertext link to the associated information. The stack may be represented to the user as a table of the form shown in FIG. 6. The user may scroll through the received links and be reminded of the context in which each link was received. In the examples described thus far, for example, the user may be provided with the title fields of the retrieved links such as "John and Martha's Wedding Portrait" and "Home on Oak Street" adjacent to actuable links which the user may follow in order to browse what information has been associated with the retrieved contextual cue signals. When the user activates a stored link, data from the spatial/temporal field associated with initial reception of the link may be passed as a parameter to the remote server. The remote server, in turn, can be configured to select information provided in response on the basis of the location and/or time at which the link was initially received by the user.

In an alternative embodiment, the portrait 60 may comprise an active display terminal which is connected to receive and to display digital images and/or text. In such an alternative embodiment, cue signal data may be encoded into a digital image, such as a digital watermark, and then filtered from the received data stream to an active transmitter of the type described in connection with FIG. 1 or FIG. 7. In such an embodiment, the cue signal transmitted at any given moment will relate to the image being displayed at the display terminal.

Another application of RFID tag cue signal generators is to provide interactive communication with other users who have encountered the same spatial context. For example, a restaurant table equipped with such a tag can be effectively configured as a portal to information about the restaurant and to other users who have dined at that table. When the data terminal receives the RFID cue signal, it then transmits the RFID code to the server 66. The server 66 then transmits a link corresponding to the restaurant table, for example, a hypertest link to an interactive menu. Such an interactive menu may include a wine list providing detailed information about the available wine selections and the associated vineyards. The menu, retrieved by the user's terminal based upon the user's proximity to the table, provides a convenient way of updating the restaurant menu to include daily specials, and may provide advertising revenue to the restaurant by serving as a gateway to advertising information for the vineyards or other producers of goods served at the restaurant. The link received in association with the restaurant RFID tag may additionally include a pointer to an interactive message board where users may read and/or post messages pertaining to their experience at that table, such as their reviews of various menu offerings.

Additionally, the message board may store and provide links to the personal profile data associated with each user, such that the present occupant of the table may obtain relevant information associated with previous occupants of the table based upon a matching interest indicated among the respective personal profile data of the respective previous and present occupants of the table. If the present occupant of the table is not operating in immediate retrieval mode, the link to the table's message board may be stored in the link retrieval stack along with an appropriate contextual identifier such as, "Table 10 at the Cyber Café".

In the embodiments described thus far, hypertext links to data are retrieved on the basis of locational proximity to a cue signal transmitter, whether the transmitter is an active transmitter or passive RFID tag. For cue signal transmitters that are intended to be associated with fixed spatial locations, the remote server may be configured to store an identification of the location of the cue signal transmitter, so that the retrieved link can be presented to the user along with an appropriate context identifier signifying the location of the cue signal transmitter. However, for links that are exchanged among respective mobile terminals, an alternative mechanism would be required in order to provide an appropriate location identifier to associate the retrieved link with a location in which the link was received. For example, in the application discussed above in connection with the fraternity member / lawyer, a data terminal will receive that user's cue signal when the respective users are in physical proximity, but it would be desirable to obtain information about where the exchange of cue signals occurred.

One available mechanism for identifying a physical location in association

with receipt of cue signals is the Global Positioning System (GPS). As described below, GPS signals may be employed in conjunction with the principles of the present invention to provide an equivalent to the cue signal described in conjunction with FIG. 2 above. Such an embodiment shall now be described with reference to FIG. 7.

Data terminal 80 is provided with a GPS receiver 2 which receives a GPS satellite signal 84 and decodes the GPS satellite signal 84 in order to provide the data terminal 80 with the present geographical position of the data terminal 80. The data terminal 80 is programmed to respond to the GPS positional signal by periodically transmitting its position via CDMA link 86 and the internet 88 to a position-monitoring server 90. The position monitoring server 90 maintains a current record of the geographical positions of users. The server 90 also maintains a user database 92 containing user-identifications and user personal preference profiles, including hypertext links established by the users in association with their personal preferences. In such a system embodiment, the cue signal emitted by transmitter 34 described in association with FIG. 1 is functionally replaced by the GPS signal 84 received by the data terminal 80 by programming the server to associate a location key corresponding to the geographical location at which a link is to be transmitted to the user. For this purpose, the server 90 is provided with a location database 94 in which particular geographical locations can be associated with data identifying the location and/or with indices of links to further information associated with the location.

When the user moves into a location at which such a key has been stored, the associated link is sent to the data terminal 80. For example, the contractor

performing home improvement work at a particular location may have a link to information concerning the work and/or the contractor's services associated in the location database 94 with the location at which the work is being performed. Then, when the user comes into the vicinity of that location, as detected by the server 90 receiving positional data from the user's terminal 80, the server 90 will send the link corresponding to that location to the user's terminal. In immediate retrieval mode, the user's terminal will obtain and display the relevant information. In delayed retrieval mode, the user's terminal will store the link in association with an identification of the location at which retrieval of the link was activated. When the user later retrieves information from the server, the stored location identification, as well as the date and time of receipt, can be passed back to the server as a HTPP request parameter. By this mechanism, the server can be configured to provide a customized based on the location, date.

Additionally, use of the GPS system can provide for interactive exchange of data between user terminals, by enabling the server to mediate such exchange based on detection of multiple users within a predetermined geographical proximity to each other. For example, the position of a second user equipped with a similar data terminal 96 will also be monitored by the server 90. Whenever the server 90 determines that two users are within a predetermined proximity to each other, the server 90 retrieves the respective personal profiles of the users and determines whether there is a matching category of common interests between the users, or whether either user has elected to receive data associated with other co-located users. If a match is detected by the server, then the server transmits the link(s) to each user which correspond to the matching profile entry. If the user is

operating in immediate retrieval mode, the user's data terminal will fetch the relevant information, and be immediately alerted to the proximity of the other user associated with that information. If the user is operating in delayed retrieval mode, then the data terminal will store an identification of the user's location in association with an identification of the other user and the received link to the other user's information. Hence, when the user is later reviewing the retrieved information, the user will be notified of the source of the retrieved information along with the locational context in which the information was retrieved.

As can be appreciated, an information delivery system is herein described in which a mobile portable data terminal is configured to receive a cue signal associated with a location or with proximity of a cue signal generator (whether a fixed cue signal generator or a mobile cue signal generator, such as another terminal). In the embodiments described above, the cue signal has been described as comprising an active RF signal, a passive resonant signal issued in response to an RFID probe signal, or a GPS signal. In each instance, receipt of the cue signal triggers retrieval of remotely stored data associated with the identity or location of the cue signal generator. Moreover, the information retrieval process can be supplemented by personal profile data to enhance the relevance of the spatially contextual information obtained by the terminal. In yet other embodiments, the cue signal may be provided by other physical phenomena, such as by audio or chemical sensing transducers connected with the portable data terminal. For example, in one embodiment of the invention, the portable data terminal may be provided with a microphone for monitoring incoming audio signals in the vicinity of the terminal. Such incoming audio signals may include encoded audio cue

signals, such as an encoded sub-band audio signal included in a radio broadcast, which will be recognized by the portable data terminal and trigger retrieval of remotely stored information relevant to the incoming audio signal. In the case of a radio broadcast, for example, audio cue information can be inserted into a broadcast transmission in order to trigger retrieval of contextually relevant information pertaining to the current audio program. In a further embodiment of an audio cue signal-based data retrieval system, the portable data terminal may comprise audio recognition software in order to obtain cue signals corresponding to particular sounds, such as spoken words and/or music, in order to trigger retrieval of remotely stored information on the basis of recognizing such audio cue signals.

The terms and expressions employed in the foregoing are intended as terms of description, and not of limitation. Hence, while the invention has been described with reference to particular examples and preferred embodiments, there is no intention to so limit the scope provided by the appended claims, which shall be construed to encompass the full range of alternatives and equivalents within the scope thereof.

THAT WHICH IS CLAIMED IS:

1. An apparatus for receiving spatially relevant information, comprising:

a display for displaying information;

a wireless transceiver for establishing a wireless connection to a remote data network;

a receiver for receiving a cue signal from a transmitter;

a central processing unit connected with the display, the wireless transceiver and the receiver and configured for receiving the cue signal from the receiver, for obtaining a link to information on the remote data network on the basis of data encoded in the cue signal, for retrieving the information from the remote data network via the wireless connection, and for operating the display to display the retrieved information.

2. The apparatus of claim 1, further comprising an RF transmitter for transmitting a second cue signal associated with the user of the apparatus.

3. The apparatus of claim 1, comprising a memory and a user input interface configured for allowing the user to retrieve information from the memory, wherein the processor is further configured to store the link in memory such that the link may be accessed and information may be obtained from the remote computer network when the apparatus is not in proximity to the local transmitter.

4. The apparatus of claim 3 wherein the cue signal includes a profile identifier

containing a code corresponding to designated categories of interest for which the information on the remote data network is relevant, wherein the processor is configured to construct and store in the memory a personal profile of the user on the basis of interest categories selected by the user, and wherein the processor is further configured to detect a match between the profile identifier and the user's personal profile when a cue signal is received in order to retrieve the information on the remote data network only when a match is indicated.

5. The apparatus of claim 4 wherein the processor is configured to transmit a parameter corresponding to at least a portion of the profile identifier to the remote data network in order to select among a plurality of potentially relevant sources of information associated with the link.

6. The apparatus of claim 1 wherein the receiver comprises an RF receiver.

7. The apparatus of claim 1 wherein the cue signal comprises a Global Positioning System signal.

8. A method of obtaining spatially related information from a remote data network to a portable data terminal, comprising the steps of:

establishing a data connection with the remote data network;

receiving a locally-generated cue signal from a transmitter proximate to the portable data terminal;

decoding the cue signal to obtain a pointer to information on the remote

data network on the basis of an address encoded in the cue signal; and

retrieving the information from the remote data network.

9. The method of claim 8 further comprising the step of displaying the information on the portable data terminal.

10. The method of claim 9, comprising the steps of:

storing the pointer in a memory of the portable data terminal; and

retrieving the information from the remote data network under operator control of the portable data terminal when the terminal is no longer in proximity to the transmitter.

11. The method of claim 10, wherein the decoding step comprises the step of obtaining a profile identifier from the cue signal, and further comprising the steps of:

comparing the profile identifier with a pre-determined personal profile generated by the operator of the portable data terminal; and

wherein the retrieving step comprises the step of retrieving the information from the remote data network only if the comparing step indicates a match between the profile identifier and the pre-determined personal profile of the operator.

12. A method of exchanging information between a first portable data terminal

and a second portable data terminal comprising the steps of:

each portable data terminal transmitting a cue signal encoding links to respective information stored on a remote data network;

each portable data terminal receiving the cue signal transmitted by the other portable data terminal when the respective portable data terminals are within physical proximity of each other;

each portable data terminal decoding the respective received cue signals to obtain the links to the respective information stored on the remote data network; and

each portable data terminal retrieving the respective information from the remote data network via a wireless connection to the remote data network.

13. The method of claim 12 comprising the steps of:

configuring each of the personal data terminals to store respective personal profile data associated with the respective users;

wherein the step of transmitting the cue signals comprises the step of encoding a profile identifier associated with the respective personal profiles;

wherein the decoding step comprises each portable data terminal obtaining the profile identifier from the respective received cue signals; and further comprising the step of:

comparing the respective received profile identifiers with the respective personal profiles data stored in each portable data terminal; and

each portable data terminal retrieving the respective information from the remote data network only when the comparing step indicates a match between the

received profile identifier and the personal profile.

14. The method of claim 13 wherein said retrieving step comprises the step of transmitting a parameter to the remote data network, said parameter determined on the basis of the match determined on the basis of said comparing step, in order to selectively retrieve on of alternative sets of information available from the remote data network.

15. The method of claim 11 wherein the step of retrieving information from the remote data network comprises the step of transmitting a parameter identifying at least one of a time, date and location at which the cue signal was received.

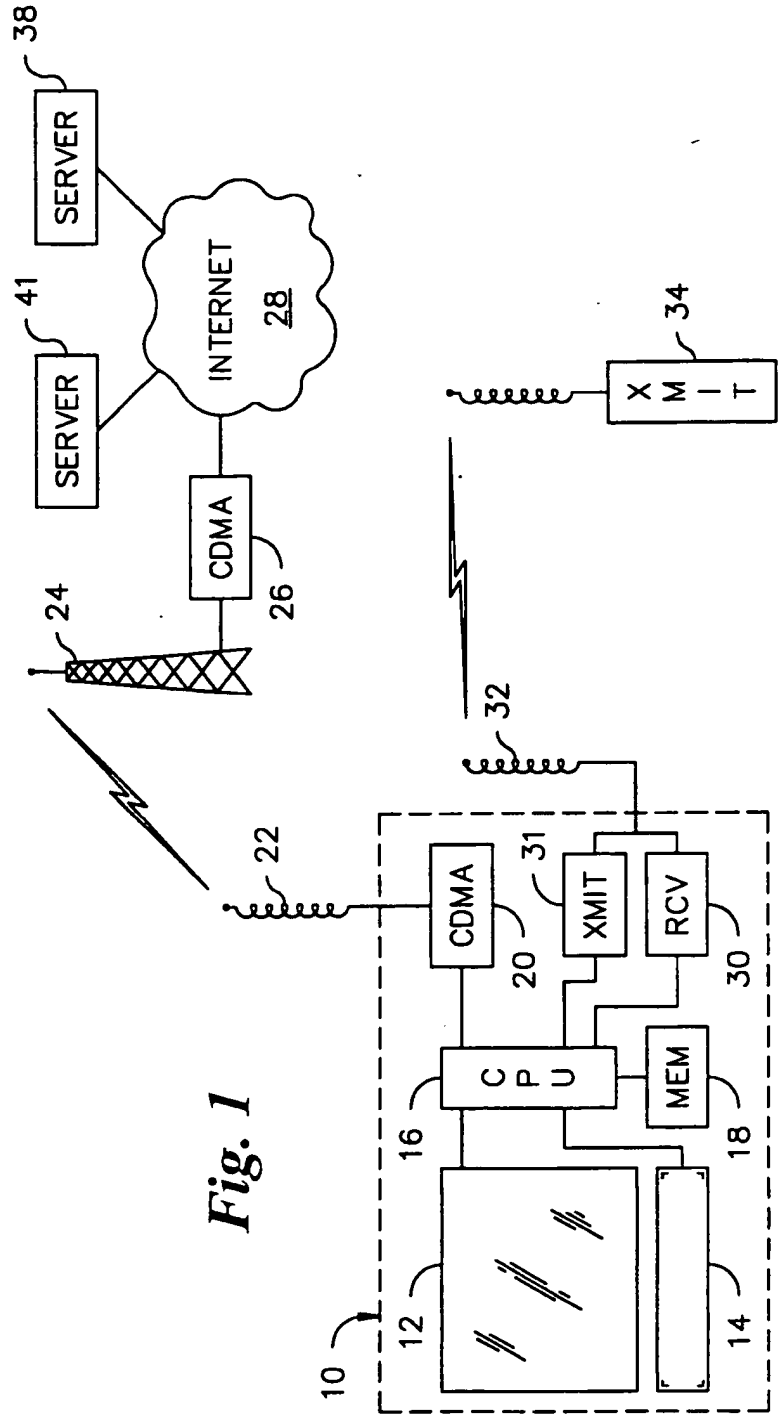
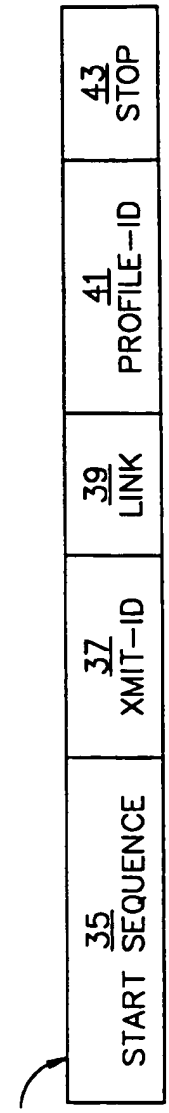

38
SERVER
41
SERVER
INTERNET
28
CDMA
26
24
34
X
M
T
32
22
CDMA
20
31
XMIT
RCV
30
C
P
U
16
MEM
18
12
14
10

Fig. 1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STOP
41
PROFILE-ID
39
LINK
37
XMIT-ID
35
START SEQUENCE
33

Fig. 2

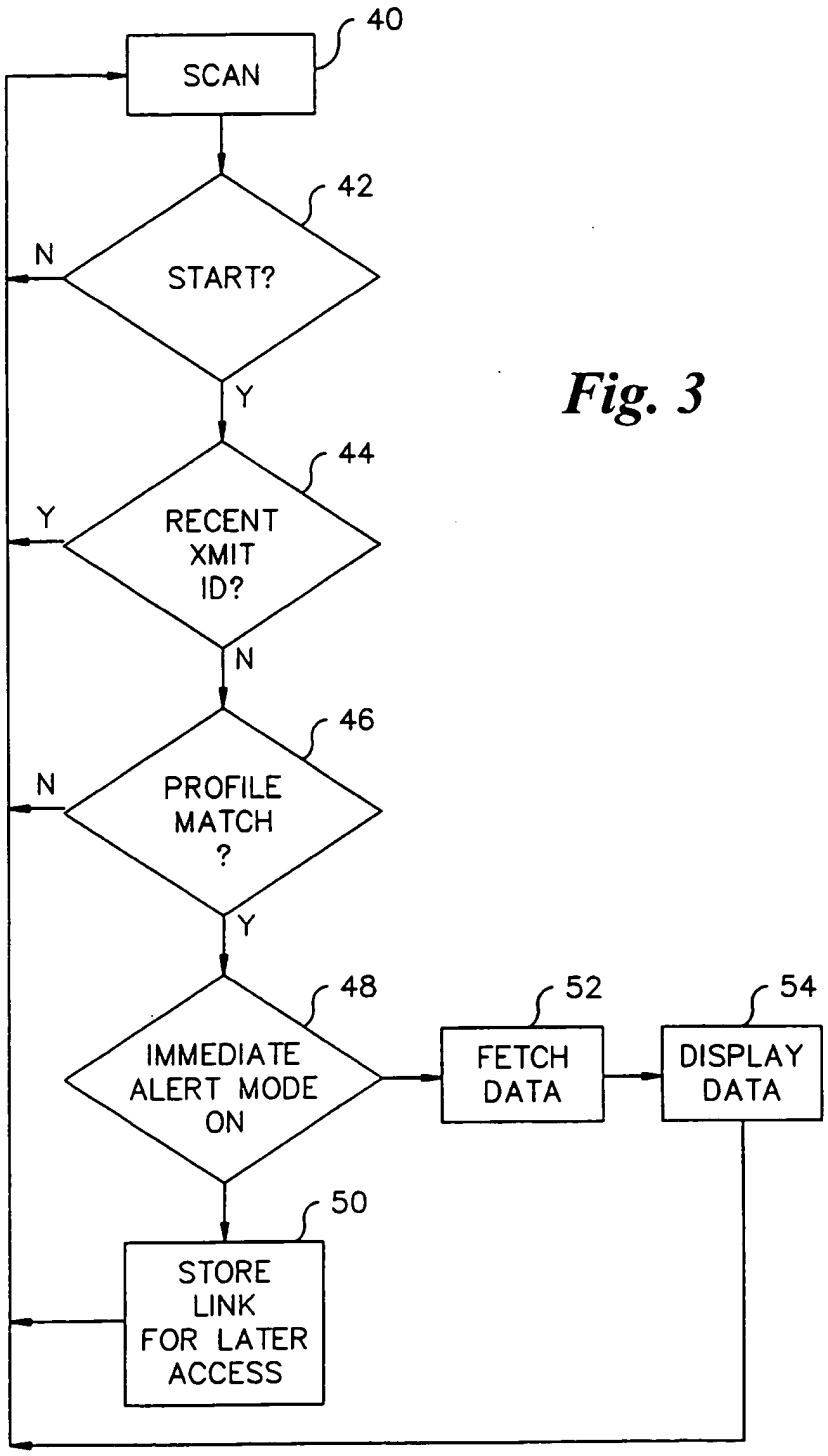

40
SCAN
42
START?
N
Y
44
RECENT XMIT ID?
Y
N
46
PROFILE MATCH ?
N
Y
48
IMMEDIATE ALERT MODE ON
52
FETCH DATA
54
DISPLAY DATA
50
STORE LINK FOR LATER ACCESS

Fig. 3

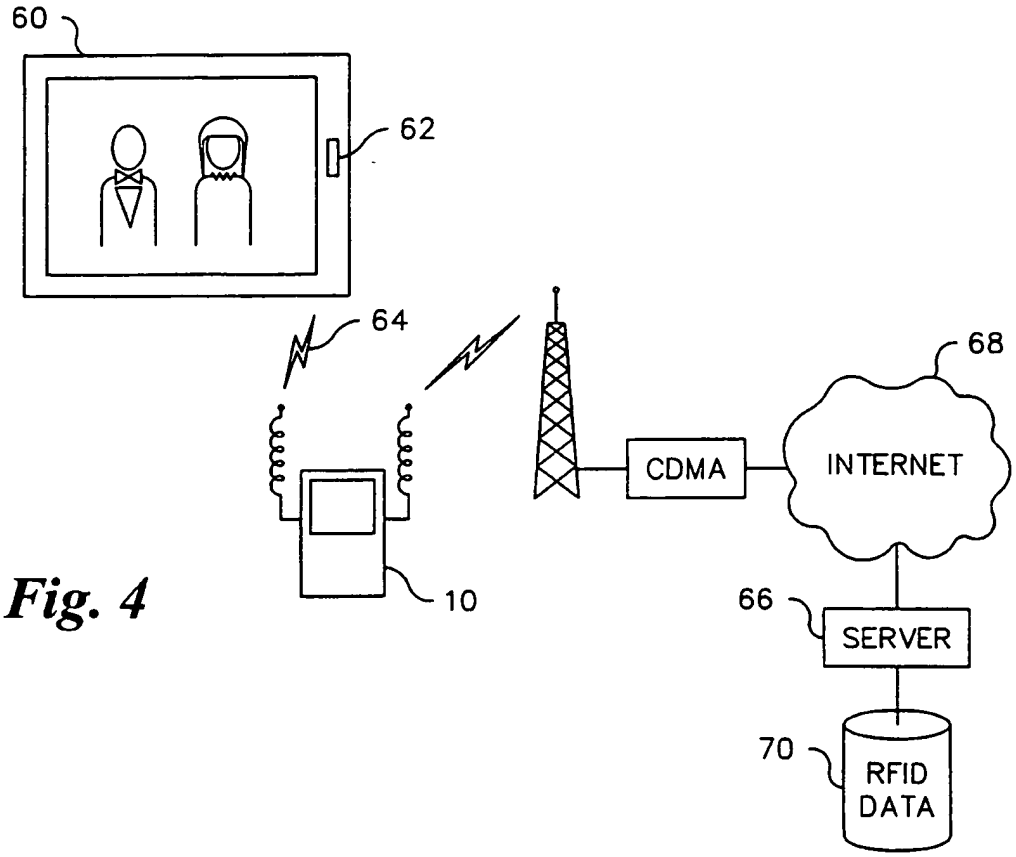


Fig. 4

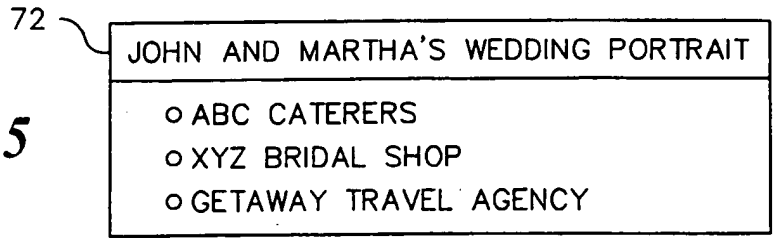


Fig. 5

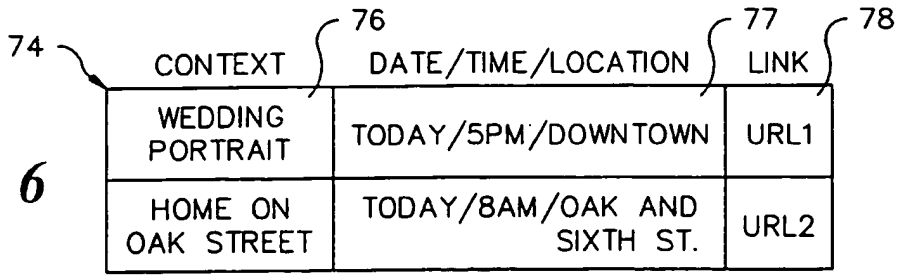
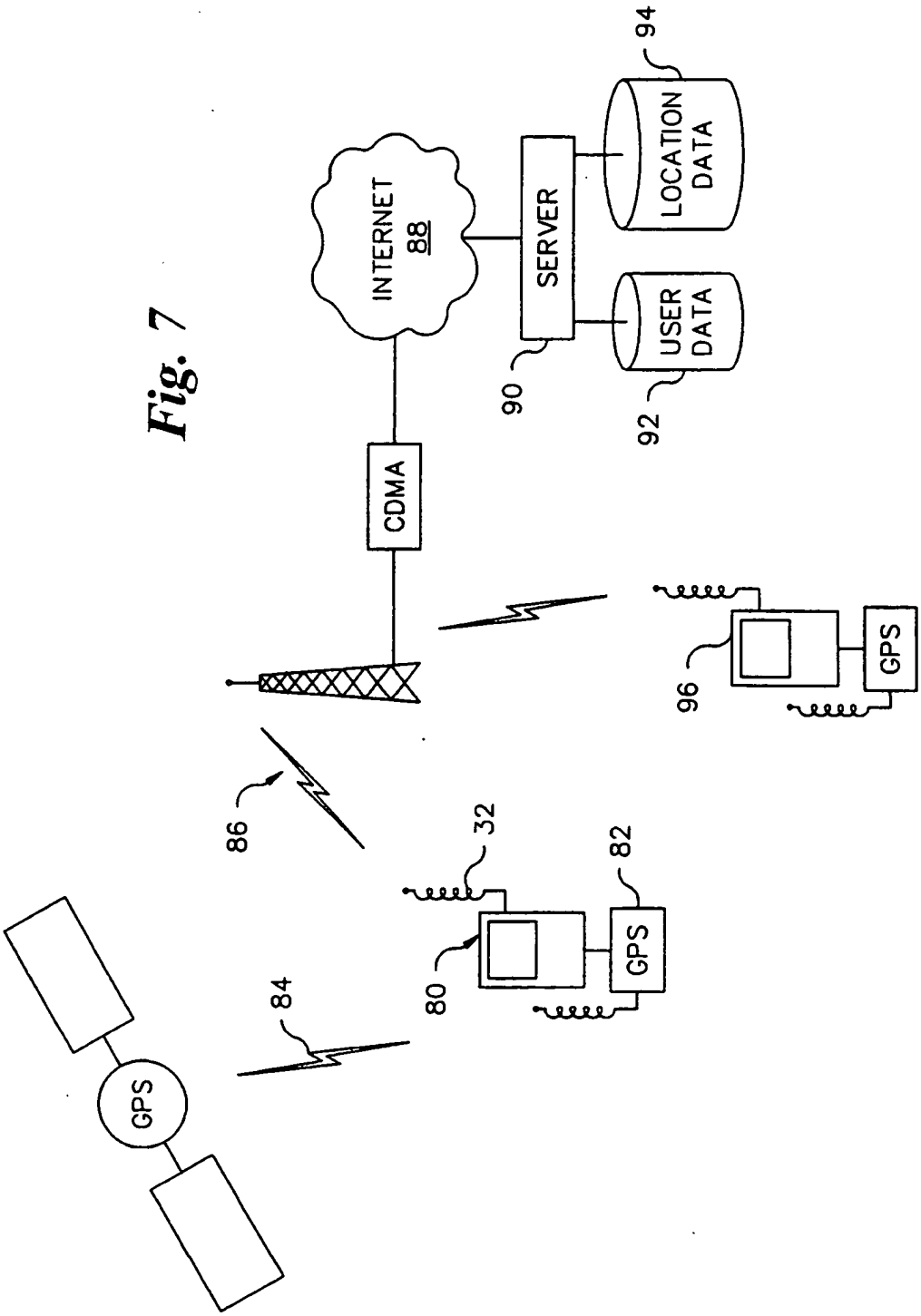


Fig. 6

Fig. 7


94
LOCATION DATA
INTERNET 88
SERVER
USER DATA
90
92
CDMA
96
GPS
86
32
82
80
GPS
84
GPS

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US01/06112

A. CLASSIFICATION OF SUBJECT MATTER

IPC(6) : G06F 15/16; G01C 21/00; H04B 3/38, 7/185; H04Q 7/20
US CL : 709/203; 701/201, 211;340/825, 827; 342/357; 455/426

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
U.S. : 709/203; 701/201, 211;340/825, 827; 342/357; 455/426

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,938,721 A (DUSSELL et al) 17 August 1999 (17.08.1999), column 4, lines 63-67; column 7, lines 10-12, line 47 to column 8, line 11; column 8, lines 27-62; column 9, lines 9-10; and Fig. 1.	1, 3, 6-9
X	US 5,214,793 A (CONWAY et al) 25 May 1993 (29.05.1993), column 17, lines 29-62, column 8, lines 49-53, column 10, lines 46-48; and Fig. 12.	2-5, 10-15
X	US 5,559,520 A (BARZEGAR et al) 24 September 1996 (24.09.1996), column 2, lines 35-37; column 3, lines 28-35; and Figs. 1 and 2.	1, 8, 9

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

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"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
24 April 2001 (24.04.2001)	14 May 2001 (14.05.01)
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703)305-3230	Authorized officer Meng-Ai T An Telephone No. (703) 305-3900

Form PCT/ISA/210 (second sheet) (July 1998)